

REMARKS

Claims 1-2 and 5-12, and 15-23 are pending, while Claims 13-14, 24-29, and 31-50 stand withdrawn. Claim 1 has been amended to incorporate the subject matter of dependent Claim 3, which is now cancelled. Applicants request entry of the amendment to Claim 1, as this amendment does not raise a new issue for examination, because the concept of an electrically conductive path between the fluid distribution layer and the liquid distribution layer was previously present in Claim 3. Such embodiments have already been searched and considered by the Examiner in the previous office actions. Further, Applicants believe that this amendment places the claims in better condition for appeal.

Additionally, the Office Action does not indicate a status of Claims 13 and 14. Applicants believe that the status of these claims is "withdrawn," as Claims 13 and 14 read upon non-elected species pursuant to the December 15, 2005 response to Election of Species Requirement mailed November 17, 2005. Clarification regarding the status of these claims is requested. The Examiner is respectfully requested to enter the amendments and reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-3, 5-12, 15-21 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyazawa (U.S. Pat. Publ. No. 2003/0235735, hereinafter "Miyazawa") in view of Yamada (U.S. Pat. No. 5,432,023, hereinafter "Yamada"). This rejection is respectfully traversed.

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyazawa and Yamada, as applied to Claim 1 above, further in view of Davis (U.S. Pat. Publ. No. 2002/0001743, hereinafter "Davis"). This rejection is respectfully traversed.

Applicants respectfully submit that a *prima facie* case of obviousness has not been met for the finally rejected claims, in particular for amended Claim 1. A *prima facie* case requires that each and every element must be found in the art. See e.g., *In re Vaeck*, 20 USPQ.2d 1438 (Fed. Cir. 1991) and *In re Oetiker*, 24 USPQ.2d 1443 (Fed. Cir. 1992).

First, Miyazawa lacks any disclosure or suggestion of a liquid distribution media in electrical contact with and forming an electrically conductive path between a fluid distribution layer media and an impermeable electrically conductive element, as recited in Claim 1. Secondly, Miyazawa does not disclosure or suggest an impermeable electrically conductive element, as recited in independent Claim 1. Neither Yamada nor Davis account for these deficiencies.

The test for obviousness is not whether the features of one reference may be bodily incorporated into another reference, rather the question is whether the combined teachings of the respective references suggest and render the claimed subject matter obvious. *In re Wood*, 202 USPQ 171, 174 (CCPA 1979). The motivation to combine requires what is desirable, not what would merely amount to what is feasible, i.e., a trade-off. *Winner International Royalty Corp. v Wang*, 53 USPQ.2d 1580 (Fed. Cir. 2000). Here, the cited references fail to provide a sufficient motivation to desirably combine and rather teach away from arriving at the presently claimed invention.

The Office Action states that in the Miyazawa reference "the LDM [14] forms an electrically conductive path between the ECE [4] and FDL [21]." Final Office Action Mailed August 24, 2006, Page 3 lines 2-3. However, this statement is wholly unsupported by the Miyazawa reference. The Miyazawa reference consistently teaches that the hydrophilic layer 14 is removed from the electrical contact regions 23 of the ribs 11 of the separator plate 4.¹ This hydrophilic membrane 14 is the same element that the Examiner relies upon as being analogous to the presently claimed liquid distribution media. See *e.g.*, Final Office Action Mailed August 24, 2006 Page 2 lines 18-19 and Page 3 lines 2-3. Since Miyazawa repeatedly teaches removal of the hydrophilic layer 14 from the top portion 23 of the electrically conductive rib 11 of the separator 4 that contacts the gas diffusion layer 21 it cannot provide the teachings necessary to arrive at Claim 1. Stated in another way, Miyazawa teaches that the hydrophilic layer 14 is only disposed on the bottom and side wall faces 12, 13 and not on the top face 23 of the rib 11 where it would be required to be present in order to establish an electrically conductive path between an impermeable element and the fluid distribution layer (Paragraphs [0028 and [0033]]. Thus, Miyazawa does not and cannot meet the limitations of Claim 1, because the hydrophilic membrane 14 (liquid distribution media) is not present on the top portions 23 of the ribs 14 and thus cannot possibly form an

¹ See *e.g.*, Paragraph [0030] teaches that hydrophilic membrane 14 is removed from the surface of the rib 11 that contacts the fluid distribution layer 21; Paragraph [0033] "A hydrophilic membrane is formed by coating a slurry or a coating containing a hydrophilic material onto only the bottom 13 and both wall faces 12 of the gas flow groove 7; "Since the top face 23 of the rib 11 contacting to the MEA 20 is not provided with a hydrophilic membrane 14"; "After forming the hydrophilic membrane 14 on the surface of the separator 4, the processes of steps S4, S5 are performed to remove the hydrophilic membrane from the surfaces other than the bottom 13 and wall faces 12." Paragraph [0038]; "Then in a step S5, the hydrophilic coating on surfaces other than the bottom 13 and both wall faces 12 of the gas flow groove 7 is removed. It should be noted that the hydrophilic coating on the top face 23 of the rib 11 is removed herein." Paragraph [0040]; See also Figure 3, Step S5 "Hydrophilic Coating on Surfaces Other than Bottom and Both Wall Faces of the Gas Flow Groove is Removed."

electrically conductive path between an impermeable element (entirely absent from Miyazawa) and a conductive fluid distribution layer (e.g., 21). Miyazawa provides no disclosure, suggestion, or motivation to arrange the architecture of a fuel cell element to create an electrically conductive path between an impermeable electrical element to a fluid distribution layer by respective electrical contact with a liquid distribution media.

Further, the Yamada explicitly teaches away from the liquid distribution media being formed of an electrically conductive material that forms an electrically conductive path between the impermeable separator plate, liquid distribution media, and the fluid diffusion media. Yamada states that “the materials for the wicks [to transport liquids] are not allowed to be conductors because conductors possibly form a cause for a short circuit.” Col. 47 lines 10-15 (*emphasis added*); see also, Col. 38 lines 8-9 and 67-68; and Col. 39 lines 21-25.

Obviousness cannot be predicated on a combination of references that produces a seemingly inoperable device. *McGinley v. Franklin Sports*, 60 USPQ.2d 1001, 1010 (Fed. Cir. 2001) citing *In re Spinnoble*, 160 USPQ 237, 244 (CCPA 1969). In this regard, modifying Yamada in such a manner to provide electrical contact through the liquid distribution media would render the fuel cell of Yamada to electrically short circuit, *i.e.*, it would be inoperable for its intended purpose. Thus, Yamada teaches away from the subject matter of amended Claim 1 that relates to an electroconductive element that comprises an electrically conductive porous liquid distribution media that forms an electrically conductive path.

Additionally, Miyazawa specifies that plate 10 of the separator 4 is formed of a porous material, not an impermeable material. See for example, Paragraph [0030]: “the

porosity of the material forming the rib 11 is higher than that forming the plate 10.” As appreciated by those of skill in the art, there is a vast difference in control of pressure differentials of various reactants and fluids within a fuel cell that employs porous separators, versus those that employ impermeable separators. Thus, the pore sizes of materials, reactant flow rates, and pressure differentials are entirely different between those fuel cells that use porous separators as opposed to impermeable separators.

Similarly, the Yamada reference contains various descriptions of designing porosity for the separator plate to maintain separation between liquid fuel side (anode) and oxidizing side (cathode).

Thus, Miyazawa has no disclosure or suggestion that any portion of a separator should be impermeable or that the materials selected for Miyazawa would have any applicability to the presently claimed invention. Further, none of the other cited references provide the motivation or suggestion to modify Miyazawa to arrive at the claimed invention.

For the following additional reasons, Claims 6, 8, and 12 are allowable over the cited art. Claim 6 recites that the liquid distribution media overlies substantially all of the major surface of the impermeable substrate. Clearly, Miyazawa discloses discrete regions of hydrophilic membrane 14 that do not cover all of the surfaces (sides 12, bottom 13, *and* top portions 23) of the ribs 14, notwithstanding the absence of an impermeable element.

Moreover, Claim 8 recites the liquid distribution media forming an undulated configuration of peaks (lands) and valleys (grooves). Miyazawa has a hydrophilic

membrane 14 lining the grooves (side and bottom portions 12, 13) of the rib material 14 rather than forming and defining peaks/lands and grooves/valleys.

Claim 12 recites a liquid distribution layer that comprises two distinct layers. None of the cited references discloses a liquid distribution layer that comprises two distinct layers having different hydrophilicity.

Since Yamada does not account for any of these deficiencies, Applicants submit that the presently claimed invention is allowable and request reconsideration thereof. The Miyazawa reference either standing alone or in combination with the Yamada or Davis reference, fails to disclose, suggest, or motivate one of skill in the art to arrive at the invention in 1-3, 5-12, 15-21 and 22-23. As such, Applicants respectfully request reconsideration of Claims 1-3, 5-12, 15-21 and 22-23 and withdrawal of the rejection.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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